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HELMINTH PARASITES OF THE PURPLE-NECKED ROCK WALLABY, *PETROGALE LATERALIS PURPUREICOLLIS*, FROM QUEENSLAND

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Summary

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Examination of 12 *Petrogale lateralis purpureicollis* from north-western Queensland for helminths yielded one species of cestode and 12 species of nematodes, five of which represent new host records. The diversity of the helminth community present was comparable with that found in other species of rock wallabies. The helminth community was divisible into three distinct groups, species known only from the various subspecies of *P. lateralis*, species found only in rock wallabies and species found commonly in the sympatric macropodid *Macropus robustus*, presumably acquired by host switching in shared habitat.

Key Words: Nematoda, Cestoda, *Petrogale lateralis purpureicollis*, Macropodidae, new records.

Introduction

The helminth parasite faunas of many species of wallabies and kangaroos are still relatively poorly known (Spratt *et al.* 1991; Beveridge & Spratt 1996). Among rock-wallabies of the genus *Petrogale* Gray, 1837, only the parasites of species occurring along the eastern coast of Queensland, members of the *P. penicillata* (Gray, 1825) complex (the brush-tailed rock wallabies) (i.e. *P. assimilis* Ramsay, 1877, *P. godmani* Thomas, 1923, *P. herberti* Thomas, 1926, *P. inornata* Gould, 1842, *P. mareeba* Eldridge & Close, 1992, *P. penicillata*, *P. sharmani* Eldridge & Close, 1992) and *P. persephone* Maynes, 1982 (the Proserpine rock wallaby) have been studied in any detail (Beveridge *et al.* 1989; Begg *et al.* 1995). By contrast, records of parasites from black-footed rock wallabies, members of the *P. lateralis* Gould, 1842 complex, the short-eared rock wallaby, *P. brachyotis* (Gould, 1841) and the yellow-footed rock wallaby, *P. xanthopus* Gray, 1855, are based on incidental collections from a very small number of hosts. No helminth parasites have been reported from the monjon, *P. burbidgei* Kitchener & Sanson, 1978, the Cape York rock wallaby, *P. coenensis* Eldridge & Close, 1992 or Rothschild's rock wallaby, *P. rothschildsi* Thomas, 1904 (Spratt *et al.* 1991).

The parasites of the purple-necked rock wallaby, *P. lateralis purpureicollis* Le Souef, 1924, from north-western Queensland are poorly known, with current records based on the examination of a small number of specimens from Dajarra, Queensland (Beveridge *et al.* 1989). The parasites of this subspecies of rock wallaby are of particular interest, since they appear to differ significantly from those found in members of the *P. penicillata* complex from coastal Queensland (Beveridge *et al.* 1989). The different subspecies of *P. lateralis* occur in disjunct populations across the entire western half of the Australian continent (Briscoe *et al.* 1982; Strahan 1995) with *P. l. purpureicollis* being the most eastern subspecies of the complex. *Petrogale lateralis purpureicollis* is separated from the most western populations of *P. assimilis*, a member of the *P. penicillata* complex, by approximately 500 km and might therefore be expected to act as an indicator of the extent of differences between parasite faunas of the *P. penicillata* and *P. lateralis* complexes.

It is not possible to conduct extensive samplings of rock wallaby populations which are uncommon or which occur in a restricted geographic range simply to investigate their helminth parasites. Therefore, animals which have died from other causes often provide valuable information about the prevalence and intensity of infection with internal parasites. This paper presents data on parasites of *P. l. purpureicollis* obtained from animals killed by motor vehicles in north-western Queensland and investigates the similarities of its parasite fauna with that found in members of the *P. penicillata* complex.

Materials and Methods

Rock wallabies were collected as fresh road kills in the Mt Isa (20° 44′ S, 139° 29′ E) and Cloncurry (20° 42′ S, 140° 30′ E) regions of north-western

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Queensland and were stored at - 20° C prior to examination. Subsequently, carcasses were thawed, the sex and approximate age of each specimen was noted and body measurements were recorded. At autopsy, body cavities were examined for filarioid nematodes, the bile ducts for cestodes and the oesophagus for strongyloid nematodes. The entire content of the stomachs was preserved in 10% formaldehyde. The small and large intestines were opened and also examined for helminths. Any cestodes observed were washed in water and preserved in AFA (Pritchard & Kruse 1982) while the remaining intestinal content was preserved in 10% formaldehyde. Cestodes were stained with Celestine blue, dehydrated in ethanol, cleared in methyl salicylate and mounted in Canada balsam.

The stomach content was washed with tap water to remove the formaldehyde and the number of nematodes counted in a 5 or 10% subsample. All nematodes in the subsample were cleared in lactophenol and identified to determine the total numbers of each species present. The content of the small and large intestines was examined microscopically for helminths; if oxyuroid nematodes were present in the colon, their numbers were determined by a dilution method. All specimens collected have been deposited in the South Australian Museum, Adelaide (SAMA).

The prevalence and intensity of infection of each species of helminth was calculated (Margolis *et al.* 1982). The diversity of the community was assessed using the reciprocal of Simpson's Index (Greig-Smith 1964) and the prevalence classes of helminth species were used to separate "core", "secondary" and "satellite" species (Hanski 1982; Bush & Holmes 1986).

Results

Of the 12 *P. l. purpureicollis* examined, nine were males and three were females. Although no parasites were found in the body cavities, bile ducts or oesophagus, one species of cestode, *Triplotaenia mirabilis* Boas, 1902 was found in the small intestine, 10 species of nematodes were found in the stomach, all belonging to the subfamily Cloacininae Stossich, 1899 and consisting of one species of *Rugopharynx* Moennig, 1927 and nine species of *Cloacina* Linstow, 1898, while two species of nematode, the strongyloid *Macropostrongyloides baylisi* (Wood, 1931) and the oxyuroid, *Macropoxyuris* sp., were found in the large intestine (Table 1).

The percentages of helminth species in each 10% prevalence class were approximately trimodal in distribution (Fig.1); those helminths in the 0-10% prevalence class were classified as "satellite" species, those in the 21-60% class as "secondary" species and those in the 71-100% class as "core" species, following Bush & Holmes (1986). The classification of each species on the basis of prevalence is shown in Table 1. The diversity of the helminth community assessed by the reciprocal of Simpson's Index was 9.85.

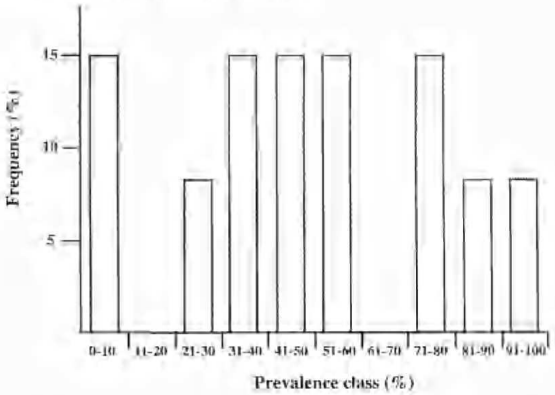

Fig.1. Frequency distribution of occurrence of helminth species in different prevalence classes.

Discussion

The collections of parasites from *P. l. purpureicollis* reported here significantly increase the number of parasite species known from this host. Beveridge *et al.* (1989) found seven species of helminths in the animals they examined (the cestode *Triplotaenia fimbriata* Beveridge, 1976 and the nematodes *Cloacina ernabella* Johnston & Mawson, 1938, *C. hydriformis* Johnston & Mawson, 1938, *C. pearsoni* Mawson, 1971, *C. vaenis* Beveridge, 1998 (=*C.* sp.1 of Beveridge *et al.* 1989), *Pharyngostrongylus lambdu* Mawson, 1965, *Rugopharynx alpha* (Johnston & Mawson, 1938) (syn. *R. australis* in part)). Subsequently, Spratt *et al.* (1991) reported an unidentified species of *Papillostrongylus* Johnston & Mawson, 1939 and Beveridge (1998) reported *C. petrogale* Johnston & Mawson, 1938, *C. parva* Johnston & Mawson, 1938 and *C. frequens* Johnston & Mawson, 1938 from this host. The current study adds the cestode *Triplotaenia mirabilis* Boas, 1902 and the nematodes *C. macropodis* Johnston & Mawson, 1938, *C. longelabiata* Johnston & Mawson, 1938, *C. echidne* Beveridge, 1998 and *Macropostrongyloides baylisi* (Wood, 1931) to the parasites known from *P. l. purpureicollis*. The species of *Macropoxyuris* found in the colon of one rock wallaby also represents a new record but is not considered further because of the unresolved status of a number of undescribed species within the genus (Beveridge *et al.* 1992, 1998).

TABLE 1. *Helminth parasites of* Petrogale lateralis purpureicollis *from north-western Queensland.*

Species	Prevalence (%)	Intensity Range (mean)	Group*
STOMACH (Nematoda)			
Rugopharynx alpha (Johnston & Mawson, 1938)	75	60-10710 (1400)	C
Cloacina caenis Beveridge, 1998	100	590-13230 (3210)	C
Cloacina echidnae Beveridge, 1998	58	32-630 (206)	2
Cloacina ernabella Johnston & Mawson, 1938	83	50-1358 (428)	C
Cloacina frequens Johnston & Mawson, 1938	33	20-65 (40)	2
Cloacina longelabiata Johnston & Mawson, 1938	42	40-97 (60)	2
Cloacina macropodis Johnston & Mawson, 1938	50	32-1060 (263)	2
Cloacina parva Johnston & Mawson, 1938	58	60-206 (100)	2
Cloacina pearsoni Mawson, 1971	75	36-630 (304)	C
Cloacina petrogale Johnston & Mawson, 1938	33	20-413 (138)	2
SMALL INTESTINE (Cestoda)			
Triplotaenia mirabilis Boas, 1902	25	-	2
LARGE INTESTINE (Nematoda)			
Macropostrongyloides baylisi (Wood, 1931)	9	1	S
Macroposyuris sp.	9	725	S

* classification based on prevalence : C= core species, 2= secondary species, S= satellite species

The diversity of the helminth community in *P. l. purpureicollis* (reciprocal of Simpson's Index = 9.85) is comparable with that found in other rock wallabies such as *P. assimilis* (10.87), *P. godmani* (13.89), *P. herberti* (10.64), *P. inornata* (11.24) and *P. persephone* (14.30) (Beveridge *et al.* 1989; Begg *et al.* 1995), as well as those of the small wallabies such as the northern nailtail wallaby, *Onychogalea unguifera* (Gould, 1841) (10.9), and the spectacled hare wallaby, *Lagorchestes conspicillatus* Gould, 1842 (11.8) (Beveridge *et al.* 1992). It is lower than values found in the red-legged pademelon, *Thylogale stigmatica* (21.9) (see Beveridge *et al.* 1992), the swamp wallaby, *Wallabia bicolor* (17.5) and various species of *Macropus* found in north and central Queensland (14.4-26.6) (see Beveridge *et al.* 1998). The helminth community of *P. l. purpureicollis* is thus moderately diverse in comparison with most macropodids and its diversity is comparable with that found in other small wallabies and rock wallabies.

The examination of prevalence classes suggested that the helminth community present in *P. l. purpureicollis* was broadly divisible into three groups, "satellite", "secondary" and "core" species, utilising the terminology of Bush & Holmes (1986). Beveridge *et al.* (1989) used the same terminology for helminths of rock wallabies of the *penicillata* complex, although the prevalence limits of the three classes differed. Of the satellite species present in *P. l. purpureicollis*, *M. baylisi* is a common parasite of the wallaroo, *Macropus robustus* Gould, 1841(see Beveridge *et al.* 1993) which is abundant in the area in which the rock wallabies were collected. The secondary species encountered included the cestode, *Triplotaenia mirabilis*, known only from the MacDonnell Ranges race of *P. lateralis* and *P. l. purpureicollis*, and the nematodes *C. petrogale*, known only from the rock wallabies *P. lateralis* and *P. brachyotis*, and *C. echidnae*, *C. frequens*, *C. longelabiata*, *C. macropodis* and *C. parva*, which are primarily parasites of *M. robustus* (Beveridge 1998; Beveridge *et al.* 1998). The core species included *R. alpha* and *C. ernabella*, which are restricted to the

MacDonnell Ranges race of *P. lateralis* and *P. l. purpureicollis*, as well as *C. pearsoni* and *C. caenis*, which occur in most species of *Petrogale* from which helminths have been examined (Beveridge 1998).

The helminth community of *P. l. purpureicollis* can therefore be categorised as comprising three distinct groups. A small number of species, *T. mirabilis*, *C. ernabella* and *R. alpha* is known only from the MacDonnell Ranges race of *P. lateralis* and *P. l. purpureicollis*; additional species, *C. caenis*, *C. petrogale* and *C. pearsoni*, occur in most rock wallaby species examined to date but in no other macropodids, while a significant suite of parasites (*M. baylisi*, *C. echidne*, *C. frequens*, *C. macropodis*, *C. longelabiata*, *C. parva*) has apparently been acquired from *M. robustus* which is the most abundant macropodid host with which the rock wallabies are broadly sympatric. Of the additional parasite species recorded in the literature from *P. l. purpureicollis*, *Ph. lambda* is common in *M. robustus* (see Beveridge *et al.* 1998) and *C. hydriformis* and *Papillostrongylus* sp. are common parasites of the red kangaroo, *M. rufus* (Desmarest, 1822) (see Beveridge 1986, 1998), a species which is also abundant in the Mt Isa region. The community of helminths present in *P. l. purpureicollis* thus consists of a small number of species, including all of those identified as core species, which are specific to rock wallabies with a number of additional species, identified within the community as secondary or satellite species which have been derived from the most common sympatric macropodid species *M. robustus*, and a smaller number of species from *M. rufus*.

While two species of *Choacina* (*C. caenis*, *C. pearsoni*) appear to be common in most species of rock wallabies examined to date (Beveridge 1998), *C. robertsi* Johnston & Mawson, 1939 which is abundant in members of the *P. penicillata* complex (Beveridge *et al.* 1989) was absent from animals examined in the present study. Similarly, *Rugopharynx zelu* (Johnston & Mawson, 1939) which is a common parasite of members of the *P. penicillata* complex was replaced by *R. alpha* in *P. l. purpureicollis*. Consequently, the helminth parasite community of *P. l. purpureicollis* suggests similarities with that of the MacDonnell Ranges race of *P. lateralis* rather than with those of the *P. penicillata* complex from the eastern coast of Queensland. Further definition of the relationships of the community of helminth parasites of *P. l. purpureicollis* requires more detailed studies of the parasite communities present in other subspecies of the *P. lateralis* complex in the Northern Territory and in South and Western Australia.

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